BC
Ministry of
Forests

GAINING SUPPORT FOR BRITISH COLUMBIA'S GYPSY MOTH WARS 1978-1988

A case study in public relations

By W. Allan Cram, Consultant
Vancouver, B.C.
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BRITISH COLUMBIA
PLANT PROTECTION ADVISORY COUNCIL

620 Royal Avenue,
P.O. Box 2523,
New Westminster, B.C.
V3L 5A8

May 1989

THE GYPSY MOTH IN B.C.

One of the most active and assertive groups dealing with threats from major new insect pests in British Columbia has been this Council's Gypsy Moth Committee. For over a decade, this group of dedicated individuals representing federal and provincial agencies of government as well as private sector interests has led the way in a series of successful eradication projects. The success in keeping British Columbia free of resident gypsy moths is a local story of particular satisfaction and pride to all of PPAC.

As part of our program of cooperation and awareness, we are pleased to extend knowledge of some of our work via this report. In particular, we point out the critical importance of an aware and supportive public for all of our successes against the gypsy moth threat to date.

Our council will continue to work towards it's established goals, especially to keep B.C. free of foreign pests such as gypsy moth. The sequel to Allan Cram's account should have an equally positivc and exciting conclusion.

Allan Oliver

A. Oiver,
Chairman.

AO/sm

Province of
British Columbia

Ministry of
Forests

May 1989

File: 150-394

Re: The Gypsy Moth.

The Ministry of Forests' Pesticide Advisory Committee was formed in 1986 to primarily assist staff in dealing with issues concerning pesticide use. The Committee has been particularly active in providing pertinent information concerning the use of herbicides and insecticides. This information base, known as the "Pesticide Information Centre," is available at all regional and district offices in the Province. A condensation of some of the details on use and regulation in British Columbia forest and range management, "A Quick Guide to Pesticides," is also available from Protection Branch at Victoria. Members of the public and special interest groups, as well as Forest Service employees, have been invited to use this broad and factual collection of information.

Once again, the Committee is pleased to share in the endorsement of a report on pesticide use. In this case, we consider the experiences in gypsy moth control gained by Agriculture Canada, as lead agency of B.C.'s Plant Protection Advisory Council Program, a story well worth documenting and sharing. We believe Allan Cram has captured the essence of this special story about a major threat to shipments of our forest products, about the deployment of a bacterial insecticide in an urban setting, and about the evolution of public awareness and support for the program. We recommend this report to everyone concerned about plant health and pesticide use in British Columbia.

J. A. Biickert
Chairman,
Pesticide Advisory Committee

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INTRODUCTION

"We were real amateurs when we started, but we did a lot of soul-searching and learned to look at eradication programs from a very different point of view." Gordon Powell, now Agriculture Canada's Plant Protection Program Manager, admits several mistakes were made during British Columbia's first attempt at eradicating the gypsy moth in 1978.

"The most important thing I learned from that experience was that even though we are a regulatory body within government with acts and legislation to prevent the spread of pests, nothing is law until the courts say so."

The gypsy moth, known as North America's most destructive pest of deciduous forest and shade trees, was detected in Kitsilano in 1978 by the use of sticky pheromone traps deployed in a grid system throughout selected areas of Vancouver. As the lead government agency to detect and control pests, Agriculture Canada began planning an eradication program for the spring of 1979. But when the media disclosed details of the program, public opposition nearly scuttled the entire effort.

Agriculture Canada's experience with previous programs to control pests and diseases, such as oriental fruit moth infestations or hoof and mouth disease, had been supported by the people concerned — usually industry-related personnel with crops or livestock at risk. Attention to public relations had not been necessary. In urban Kitsilano, however, Agriculture Canada encountered diverse personal interests and powerful lobby groups opposed to their plans.

By 1978 the Plant Quarantine Division (PQD) of Agriculture Canada was well aware that establishment of the gypsy moth in British Columbia could potentially destroy residential and recreational trees, as well as create quarantine zones or embargo conditions threatening the export of products, especially lumber. But to the residents of Kitsilano, it appeared that the government was about to march into the area to bombard private properties with chemicals to eliminate a pest no one had heard about.

That polarization of interests fuelled several confrontations between government personnel, residents, and environmentalists. At one point, the environmental group Greenpeace threatened to place a pregnant woman in front of the ground sprayers.

Last-minute meetings with the City of Vancouver Council, Vancouver Parks Board, local health officials, and Greenpeace, resulted in last-minute compromises. On June 2, 1979, 143 Kitsilano properties were treated with carbaryl and 29 with an insecticidal soap. The gypsy moth never returned to Kitsilano, but it appeared in several other urban areas of the province thereafter.

The drama heralded several changes in how government dealt with eradication programs. Environmental interest groups and government watchdogs clearly indicated to pest management officials a need to co-operate with other government and private agencies to successfully implement eradication programs.

After 1979, action taken by Agriculture Canada and the Plant Protection Advisory Council of B.C. (PPAC) established one of North America's most comprehensive interagency strategic plans to deal with gypsy moth introductions. Subsequent infestations in British Columbia were successfully eradicated in 1984, 1985, 1986, and 1988 — all with the public's full support.

British Columbia's first decade of eradication efforts revealed not only technological achievements, but the refinement of interagency co-operation, and public participation in sensitive, environmental issues. The process by which Agriculture Canada and PPAC gained public support for the continuing battle against the gypsy moth is the subject of this case study.

THE FLIGHT OF THE GYPSY MOTH

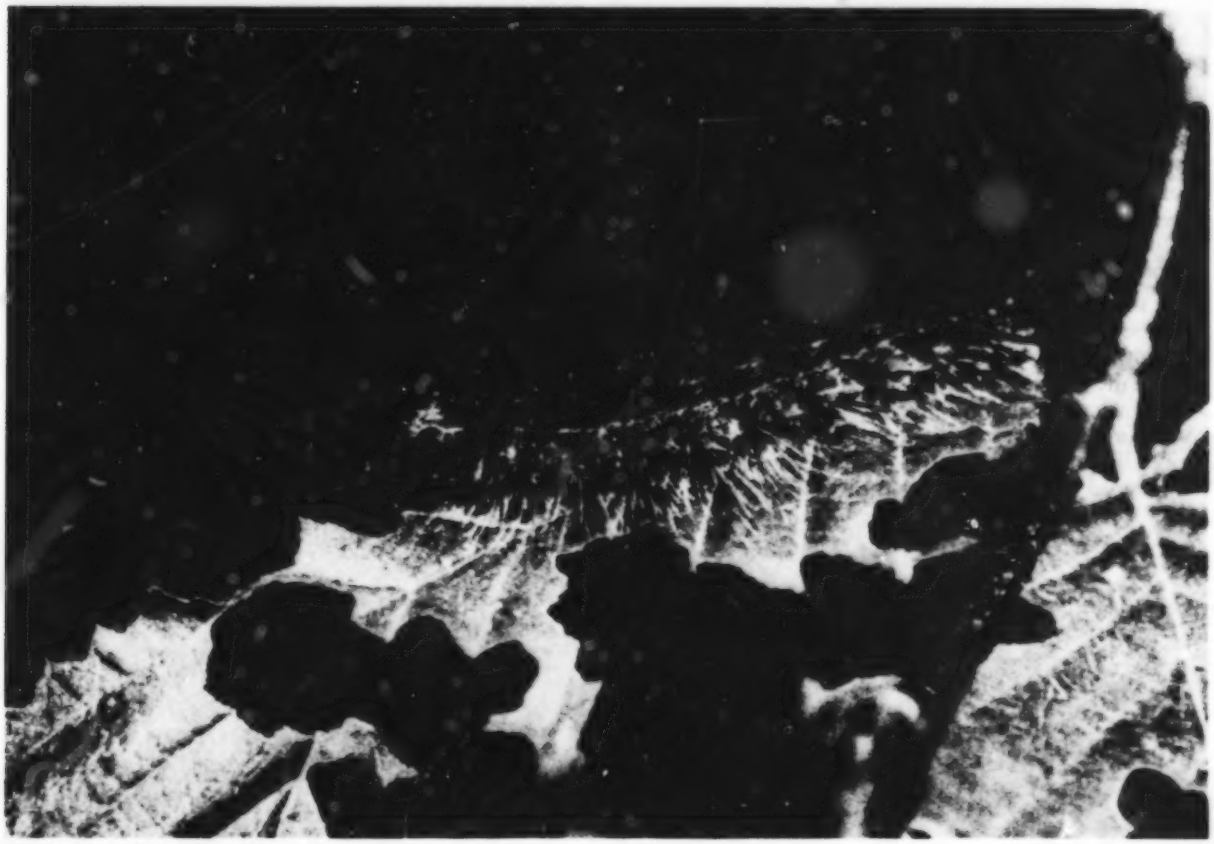
When French naturalist and entrepreneur, Leopold Trouvelot, failed in his attempt to breed a hardier strain of silkworm by crossing the American silkworm with the European gypsy moth in the 1860s, he unwittingly released a voracious leaf-eater into North America's foliage supermarket.

In its native Eurasia, approximately 200 species of parasites and predators usually keep populations of the gypsy moth, *Lymantria dispar*, in check. In North America, however, the gypsy moth has few natural predators. Thus, according to the 1889 report of the Massachusetts Gypsy Moth Committee, within 10 years of its introduction to Medford, Massachusetts, the gypsy moth had "stripped all the fruit trees, taking the apple trees first and then the pears." Maple trees on residential streets had all their leaves eaten, and residents complained that "the worms were so numerous that one could slide on the crushed bodies on the sidewalks."

In 1889, the first gypsy moth committee in North America received $25,000 from the Massachusetts State Legislature to deal with the "nuisance." The first treatment program, using Paris green, a mixture of copper and arsenic, was unsuccessful. People were then hired to spray egg masses with carbolic acid, nitric acid, and turpentine, and inspection stations were set up to check for stowaway larvae on horse carts leaving the infested area.

By 1922, established infestations were found in most of Massachusetts, all of Rhode Island, parts of Vermont, Maine, Connecticut, and New York. And more than $25 million had been spent, to little or no effect.

Gypsy moths spread by two methods: in the first of five instars, or growth stages, the tiny larvae climb to the top of a tree or shrub and suspend themselves from a thin silk thread. Because of their buoyancy at this stage, gusts of wind lift the larvae



Gypsy Moth *(Lymantria dispar)*. Forestry Canada Photo

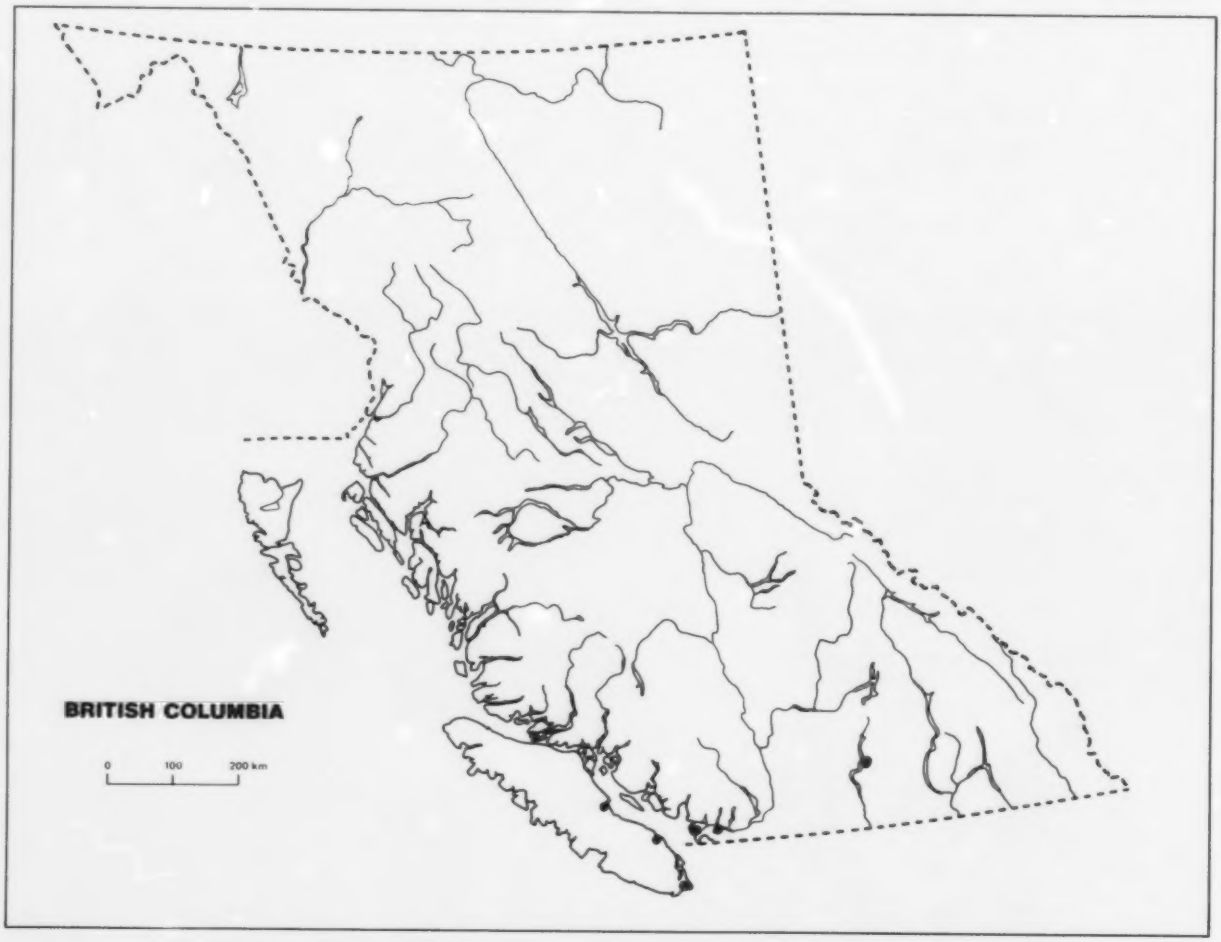
Areas in North America affected by gypsy moth.

Map courtesy CFS and Agriculture Canada

and carry them to distances of up to 65 kilometres. During July and August, female moths deposit buff-coloured egg masses in hidden places on trees, shrubs or on any article left outside — vehicles, lawn furniture, camping equipment, firewood. The egg masses hatch in early spring, and if any of the items with egg masses attached are moved into an uninfested area, the pest can be introduced to a new location.

Today, gypsy moths have spread into at least 35 American states, affecting more than five million hectares of forest, residential, and recreational land. Incipient infestations have also appeared in California, Oregon, and Washington, but no established populations exist.

In Canada, the first record of gypsy moth presence — a single egg mass found on nursery stock from Europe — was found in Vancouver in 1911 (Schmidt, 1985). The first gypsy moth infestation was discovered in southern Quebec in 1924, an event which prompted the Canadian Department of Agriculture to pass a Quarantine Act prohibiting or restricting the movement of Christmas trees and other conifers likely to harbour the gypsy moth (Jobin, 1985). Even so, the pest continued to spread and is now firmly established in Quebec and Ontario. Major infestations have also been reported in New Brunswick and Nova Scotia.



Areas in British Columbia affected by the gypsy moth.

THE SEASON OF DISCONTENT: 1978–79

The fleeting attention today's citizen can offer is caught by those in whom he believes and who talk to him in terms of his self-interest in words that he can understand.
(Cutlip and Center, 1971)

Backstage Developments

As early as 1972, plant pathologists in British Columbia recognized the need for an orgainzed approach to plant protection. In 1973, federal and provincial representatives of agriculture and forestry established the B.C. Plant Protection Advisory Council (PPAC) and began defining the council's specific terms of reference and duties. Provision for forming subcommittees to deal with specific problems such as apple maggot, biological control, pesticides, grapes, and a host of others enabled PPAC to create a special gypsy moth subcommittee in 1978 shortly after the discovery of the gypsy moth in Kitsilano.

Developments in the United States also helped to set the stage in British Columbia. In 1973, a single male gypsy moth was captured in Alameda County, California. The next year, a single male moth was caught in Renton, Washington, a suburb of Seattle. And, in 1976, an infestation was found in San Jose, California, which prompted the first eradication effort on the west coast a year later. Three more moths were trapped in Renton that year, and in 1978, 24 moths were trapped in the same area (Buffam, 1985).

While detection increased in the American northwest, Agriculture Canada's Plant Quarantine Division approached the Forest Insect and Disease Survey (FIDS) unit of the Canadian Forestry Service (CFS) in 1977 for assistance with the annual pheromone trapping survey to monitor the spread of gypsy moth within Canada. Until then, Agriculture Canada had been the only government agency conducting gypsy moth surveys and population eradication or suppression programs.

John Fitz-Gerald, head of surveys with PQD in Vancouver district, welcomed the expansion. Only a few years before, PQD and CFS had been embarrassed when an established winter moth infestation in Victoria was discovered by a biology graduate student, even though PQD had previously surveyed the area. If the gypsy moth was in B.C., Fitz-Gerald wanted to find it and eradicate it immediately.

A total of 72 gypsy moth traps were placed in B.C. in 1977 but, due to the infestations found in the western states, and additional assistance from the CFS, 210 pheromone traps were deployed in 1978. Contrary to Ottawa's understanding that the B.C. survey was being distributed evenly throughout the province, Fitz-Gerald opted to place the majority of traps in an approximate square-mile grid, to the east of Granville Street. On July 31, 1978, two moths were found at 2555 York Avenue in the Kitsilano area (*see* Appendix I).

The Slow Wheels of Bureaucracy

Because no one at PQD Vancouver district, or anywhere else in B.C. for that matter, had any first-hand experience with gypsy moths, the two specimens were mailed to Ottawa for positive identification. On August 23, more than three weeks later, identification was confirmed. Meanwhile, three more moths had been captured in the same location. PPAC reacted quickly upon receiving the confirmation. On August 29, 1979, members of the PPAC Gypsy Moth Contingency Subcommittee met to discuss possible action. The subcommittee recommended that a press release be prepared as soon as possible for distribution to the public and affected agricultural industries.

Al Schmidt, an entomologist in Ottawa, drafted a press release dated August 31, 1978. The content was discussed by the members of the subcommittee and changes were suggested. But Agriculture Canada officials had begun to focus on the biological and technical concerns of this new pest. In order to develop an eradication plan, understanding the pest became essential. Research and discussion of gypsy moth population growth, host range, seasonal life history, proven control methods, and options available for British Columbia's situation dominated the next several meetings, and thus the subcommittee's first recommendation to distribute a press release to the public and affected industries slipped to item 12 on a 15-item agenda.

As this was British Columbia's first involvement with a major introduced pest in an urban environment — and a most serious pest at that — no one had anticipated the outcome of delaying the press release. Members of the gypsy moth subcommittee were scientists and technicians, personnel who had not been trained in public relations, and the shift in priorities seemed a reasonable and professional move. This scientific behaviour is best explained by Edmunds (1981):

. . . organizations seek self-control by selecting variables that correspond to their rationality and that affirm the need for their institutional existence and maintenance. Inquiry becomes restricted to the boundaries of their rational domain, and each piece of information or selected task supports a monolithic authority network of centralized decision making — that is, organizations seek to do what they know how to do and eschew uncertainties. (p. 194)

On September 25, 1978, one month after the gypsy moths had been positively identified, the executive of PPAC met and discussed the federal-provincial joint press release. It was agreed that Agriculture Canada Information Services in Ottawa would write the press release and the British Columbia Ministry of Agriculture would distribute it. Ironically, for those disposed to superstitions, the press release was approved by Ottawa on Friday, October 13, 1978, but its distribution was delayed by events in Vancouver.

The increased activity around 2555 York Avenue alerted Merriam Doucet, a local environmentalist who, in turn, contacted the media. *Vancouver Province* reporter Suzanne Fornier called PQD Vancouver on October 13, regarding an article she had prepared for publication about the gypsy moth find in Kitsilano. Unfortunately, her story focussed on what was perceived as inaction by the federal and provincial agencies.

After lengthy discussions with her about the gypsy moth problem, publication was delayed so that a more positive report could be written. To accommodate the reporter, John Fitz-Gerald sprayed a heavily infested pear tree with creosote as a temporary measure and the new *Vancouver Province* story and photograph appeared October 19, 1978. In the article, however, John Fitz-Gerald was quoted as saying: "I'd like to see Kitsilano sprayed in the spring with Dimilin* from an airplane, but basically, we're helpless until these things hatch."

In July 1979, *Vancouver Magazine* published an article by Sean Rossiter entitled, "What Really Happened When The Gypsy Moth Came To Kits." In it, an interview with Suzanne Fornier revealed her reaction to Fitz-Gerald remarks. She said, "When I heard him say that, I thought, 'Kitsilano. Home of the environmentalists. Greenpeace. SPEC. Kitsilano. From an airplane. This man has high hopes.' " Suprisingly, her *Vancouver Province* article attracted little attention from the Kitsilano residents, or from Greenpeace, whose offices were only a few blocks away from the infested area.

Cutlip and Center (1971) wrote "The power of public opinion must be faced, understood, and dealt with. It provides the psychological environment in which organizations prosper or perish." Ascertaining and evaluating public opinion and using communications to influence public opinion are primary requirements of any organization that deals regularly with the public.

However, Agriculture Canada in Ottawa delayed the press release while local officials, who suspected potential conflict, were left waiting. In hindsight, several errors made during the initial planning stages became clear:

- failure to ascertain and evaluate public opinion;
- failure to request public relations specialists (Agriculture Canada's Information Services Branch) to counsel PQD staff in ways of dealing with the public; and
- failure to use the local news media in the best way possible to communicate important information to the public about the eradication program.

An Escalation of Conflict

. . . policies formulated without consulting the interests involved may lead to decisions which are so far outside the reigning or conceivable political consensus, or which make such unacceptable demands on a particular interest group that the resistance will thwart the action entirely.

Richard A. Frank (1977)

The approved government press release was finally issued on October 26, 1978 announcing that "eradication should be fast and efficient." Plans to follow that announcement with more detailed information about the pest, and the threat to British Columbia's environment and economy should the gypsy moth become established, were disrupted by a labour dispute at Pacific Press, publisher of both daily newspapers, the *Vancouver Sun* and *Vancouver Province*. From November 1, 1978 to June 1979, no daily newspapers were printed. Information about the proposed gypsy moth eradication program in Kitsilano — a complex issue at any time — had to reach the public via small, weekly newspapers or the electronic media.

Vancouver Plant Quarantine Division staff had evidence concerning the importance of a public relations campaign but could not convince Ottawa to take action. In October 1978, PQD Vancouver district received a letter from California's Department of Food and Agriculture which outlined in detail their gypsy moth eradication program.

The importance of public relations was prominent: "A public relations campaign in San Jose was largely responsible for the overall public acceptance and support of the project."

Agriculture Canada officials in Ottawa, however, continued assembling technical details rather than developing a companion public relations program. More than three weeks after the official press release announced the gypsy moth infestation, a letter from Al Schmidt outlined Ottawa's priorities. Recommendations regarding the use of Dimilin for ground applications were proving elusive. He Wrote:

> *We can either forget the ground applications and use Dimilin applied by aircraft or use another pesticide. At the present time the only other pesticide which we could recommend would be carbaryl. Although carbaryl is relatively safe, its use would probably provoke resistance from the environmentalist group in B.C.*

Obviously, PQD officials in Ottawa suspected that environmentalists would protest the use of chemicals to eliminate the gypsy moth but as yet, no effort had been made to contact the various interest groups. This special public was not informed about the pest, its potential impact, alternatives to spraying or the consequences of various control options. An important step in promoting goodwill between an institution and its special publics, was overlooked.

By January 4, 1979, the gypsy moth subcommittee had again placed public relations in the forefront of their eradication efforts — but there was no information services budget. While waiting for funding from Ottawa to proceed with a public information campaign, federal and provincial agriculture departments agreed that Dimilin should be applied in Kitsilano. An application for aerial spraying was submitted to the B.C. Ministry of Environment on January 25, 1979. But, as of that date, six months after the first moths were detected, there had been no public announcement of the eradication plans, nor had the municipal agencies in Vancouver been informed of the proposed spray program.

Then, on February 1, 1979, Bruce Hopper, Acting Director of PQD in Ottawa, informed Vancouver PQD personnel that "a recent interpretation of the *Plant Quarantine Act* and the Regulations under the Act determined that the Minister has not been granted the authority of Governor-in-Council to utilize public funds to pay for treatment of pest infestations." As a public information budget did not exist, PQD staff in Vancouver now had no authority to carry out the proposed eradication program. Such an oversight could have been easily rectified, but elected officials in both federal and provincial government agencies were reluctant to become involved because of elections to be held in May. A vacuum in the decision-making process soon developed. In addition, Agriculture Canada was in the midst of restructuring its organization.

The Plant Quarantine Division soon became the Plant Health/Plant Products Division, and the apparent unco-ordinated efforts between local and headquarters officials nearly allowed the gypsy moth to secure a new home on the West Coast.

While government officials searched for the technical data required to implement an aerial spray with Dimilin, environmentalists were doing their own research. Merriam Doucet, who had made herself an authority on the effects of chemicals in the environment, knew about the gypsy moths in Kitsilano in the last week of August 1978, and wanted to know what plans PQD had to eradicate the pest. She reviewed pesticide applications registered with the B.C. Ministry of Environment. When she found out about the application for a permit to spray Dimilin over Kitsilano, she immediately contacted the U.S. Environmental Protection Agency (EPA). The agency confirmed her suspicions that Dimilin was under investigation and restricted for use only over non-populated areas. Plant Quarantine Division officials were unaware of the EPA investigation, as no results had been published. Concerned about the government's lack of concern for public safety, Doucet contacted Dr. Patrick Moore of Greenpeace. Thus began what Sean Rossiter aptly phrased, "the theatre of the absurd."

On February 9, 1979 the local Kitsilano weekly newspaper *The Express*, carried the front page headline: SPRAY FEARED HEALTH HAZARD. Upon receiving a preliminary report from the EPA, Agriculture Canada withdrew its application to spray Dimilin on February 14, and Greenpeace claimed a victory. When pressed for answers regarding alternatives, Agriculture Canada officials prematurely announced the use of Orthene® or Dylox®, two substances which Doucet publicly denounced as carcinogenic or highly toxic. The media then reported the flip-flop decisions coming from Agriculture Canada's PQD personnel in Vancouver, who were, in fact, shackled by Ottawa's reluctance to grant the local office decision-making authority. Taking advantage of the government's unco-ordinated contingency plans, Greenpeace quickly prepared information leaflets for distribution door-to-door in Kitsilano. Their scare campaign against the spraying of any chemical in Kitsilano gained momentum and support from the residents, while local Agriculture Canada officials were again left waiting for decisions from Ottawa.

Unfortunately, events were happening so rapidly in Kitsilano that by the time Ottawa decided what to do about one media headline, another developed. As each day passed without any statement from government to remedy the situation, its credibility steadily declined. When Greenpeace organized a public meeting for February 22, Ottawa requested local PQD officials not attend. Their absence fuelled

Greenpeace's charges that the government was unconcerned about the safety of local citizens. Around the same time, however, Ottawa announced that the treatment substance of choice would be carbaryl, a pesticide already proven to be effective against gypsy moth. And finally, to dispel some of the fears created by Greenpeace, federal and provincial experts organized a public meeting in Kitsilano on March 8, 1979.

A public information campaign launched by Agriculture Canada after this public meeting distributed lengthy fact sheets filled with scientific data, while Greenpeace bombarded the Kitsilano residents with bold anti-spraying statements and misinformation about the effects of carbaryl.

At one point, it appeared as though the treatment effort would never be attempted and the gypsy moth would multiply and establish itself in British Columbia.

The confrontations and drama escalated until threats of violence were voiced and police attendance became necessary as Agriculture Canada attempted to fulfill its mandate. After numerous meetings in late May — after the gypsy moth eggs had already hatched and threatened to spread beyond the planned spray zone — simple compromises were reached. Residents were contacted for permission to spray their property, and given the choice of spraying with carbaryl, insecticidal soap, or having no treatment at all.

In the end, citizens decided what action would be taken to eradicate the pest, while government's compulsory plans and statutes were both ineffective and inapplicable.

Some 1978–79 Headlines.

GYPSY MOTH CONTROL SUBSTANCES

As noted earlier, Massachusetts officials used Paris green — a mixture of copper and arsenic — on the gypsy moth larvae in 1889. Egg masses were sprayed with carbolic acid, nitric acid, and turpentine.

Since then, various conbinations of chemical pesticides and parasites have been used to battle the gypsy moth in the United States. In 1957, DDT was sprayed over one million hectares of land in Pennsylvania, New York, and New Jersey. Public opposition to DDT eventually cancelled eradication plans in Pennsylvania in 1963, and a policy of "containment" came into effect in the northeastern states. The substances used were trichlorfon and carbaryl (Nichols, 1985).

The first gypsy moth infestations in Quebec in the early 1920s were eradicated by spraying lead arsenate, banding trees with burlap, and burning potential habitats such as shrubby vegetation. Agriculture Canada applied an aerial application of DDT over woodlots in Quebec in 1960, but changed to carbaryl for each application thereafter until 1977. Dimilin was then used for two years and, in 1979, Thuricide® a formulation of *Bacillus thuringiensis (B.t.)* was applied, followed by a combined application of carbaryl and *B.t.* in 1981. It is important to note that Quebec maintained a policy of containment rather than eradication (Jobin, 1985).

THE RE-EVALUATION YEARS: 1979 - 1982

The sudden and intense public reaction to Agriculture Canada's gypsy moth eradication program was of great concern to all the member agencies of PPAC. Foremost to PPAC's executive was how to avoid a similar situation the next time a pest appeared in an urban environment. British Columbia's Ministry of Agriculture (BCMA) officials, who had recognized certain flaws in the federal government's handling of the treatment program, developed a paper to advise ministers and deputy ministers on ways to avoid controversy in the future. The report, "The Gypsy Moth Episode in B.C. — How to Deal with Controversial Environment Situations", recognized:

- a reluctance to allow local officials to act on their own;
- failure to place a strong administrator on the scene to head the program; and
- that public officials, including specialists, need training in dealing with the mass media; i.e., they must learn how to write short, colorful press releases.

Agriculture Canada also recognized the mistakes and immediately began remedial action. Throughout the summer of 1979, Information Services Branch in Ottawa issued frequent press releases updating the status of the gypsy moth in British Columbia. Concerned that the gypsy moth could be transported to other areas in trash, local plant health officials announced a free trash pick-up service in the Kitsilano area scheduled for July 31, 1979. Undoubtedly, these two steps helped Agriculture Canada regain some of their public credibility.

By September 1979, Agriculture Canada drafted two gypsy moth control plans — one for use in the event that no male gypsy moths were found, the other in case another infestation appeared. Both plans focussed on public information and participation. Some highlights of these plans included:

- homemaker letters reporting on trap findings, outlining plans for the coming year, and requesting continuing co-operation were to be distributed;
- Information Services Branch, Ottawa, was to write any necessary press releases and become involved in preparing a draft plan of attack in the event that another spray program had to be undertaken in British Columbia;
- the director of Plant Health/Plant Products in New Westminster was designated as primary media contact person, and all legitimate interest groups were to be contacted and asked for their assistance before, during, and after the public meetings, now scheduled to begin in October;
- current research on alternative substances was to be made available. (As John Berry, Chief Liaison Officer with Agriculture Canada wrote: "This is more crucial when a substance is identified as the choice, but if Greenpeace is better informed than government again this year, we should not be surprised if citizens begin to think Greenpeace is also more expert than Agriculture Canada."); and
- arrangements for the public to view the newly-completed Agriculture Canada film, "The Gypsy Moth: A Dilemma" were to be made.

Agriculture Canada learned to focus public attention on the damage potential of the pest, and to explain the necessity and advantages of spraying. Although the new eradication plans were not used immediately, their creation helped to increase co-operation between the various government agencies. New gypsy moth information was gathered and distributed to the members of PPAC and to the Information Branch in Ottawa.

A number of published reports about gypsy moth control programs in the eastern United States — especially Pennyslvania and Maryland — as well as eradication programs in Washington and California, provided members of PPAC in British Columbia with valuable knowledge of large and small-sized infestations and effective control measures. In contrast to the frantic search for technical and biological information about the gypsy moth in 1978–79, pest management officials now had verifiable facts and figures on the best methods to eradicate the moth in any given environment. As well, with assistance from Information Services, Ottawa, PQD staff were better prepared to evaluate and inform public opinion.

When a single moth was captured in Tsawwassen in 1980, a short press release informed residents of the potential threat and explained that intensified trapping and egg-mass searches were the only measures anticipated. Nevertheless, information brochures and questionnaires were distributed in the event that positive egg-mass searches warranted some kind of eradication program.

LOCAL INVOLVEMENT

That local Agriculture Canada officials could not act independently from Ottawa during 1978–1979 contributed to the public controversy at that time. The centralist decision-making structure created the perception that officials thousands of miles away were deciding the fate of an area in which they had no stake. The headline of the *Vancouver Herald* on May 9, 1979 read: OTTAWA'S ARROGANCE CRUMBLES IN KITS.

Much of the success of the gypsy moth eradication programs in Courtenay (1985), Chilliwack (1985–1987), and at Parksville, Colwood, and Kelowna (1988), can be attributed to the new commitment to local involvement.

Plant Health program officers Douglas Kyle and Sue Tritter travelled the length of Vancouver Island, placing and inspecting pheromone traps, and spending considerable time talking with homeowners about the gypsy moth. When moths were found, homeowners already knew something about the problem. This continual contact with the public is perhaps the most valuable aspect of the current public awareness program for gypsy moth in British Columbia. Local staff often live in the same area where moths are found, and a rapport between citizens and government officials can often be developed.

Nowhere in B.C.'s experience with the gypsy moth was this more important than in Kelowna. Because the largest number of moths to date were captured there, the threat of an established gypsy moth population seemed imminent. The area's economy, consisting of shipments of fruit, nursery stock, and forest products abroad, was in danger.

Local BCFS and BCMA officers had had experience with an active environmental group, EarthCare, and that information was passed along to Plant Health. With a legitimate interest group identified and public opinion determined by personal contact between residents and local Plant Health officers, a comprehensive public relations plan was developed. An operational workshop, held in Summerland in November 1987, dealt with public relations and briefed all personnel involved with the gypsy moth on procedures should problems arise.

As a result, public awareness dominated the Kelowna treatment program. When pheromone traps were placed within the city, homeowners were informed, either in person, or by a letter left at their door if no one was home. In 1986, when the first moths were found, program officer Claire Martin approached the local press. Residents and interest groups were then informed about the potential threat of the pest and what Agriculture Canada could do to prevent the gypsy moth from becoming established. When high density trapping resulted in more moths being captured in 1987, some residents were already aware of the next step — a spray program the following year.

The environmental group EarthCare presented Don Bertoia, pesticides program officer, with eight reason not to use *B.t.* over Kelowna in 1988. Bertoia met with EarthCare after the public meeting to discuss their concerns. Dr. Duncan Innes, Chief Pathologist at the Kelowna General Hospital, provided invaluable medical support for the use of *B.t.* EarthCare then carefully considered the economic threat to B.C. and the disruption to the public anticipated by aerial spraying as opposed to ground spraying, and consented to support the program: "EarthCare will not appeal this spray permit. There is an immediate need to arrest this type of moth infestation." (*The EarthCarian*, 1988).

Bertoia, Martin, and Rob Ormrod, a local Plant Health officer recently transferred from eastern Canada, where gypsy moth infestations are established, then went door-to-door to get permission from each homeowner to spray their property.

"We sent out 1,000 information packages on *B.t.* and the gypsy moth, as well as questionnaires and consent forms and got back over 500," said

"The key to success is the local contact."

Photo by S. Sheffield, Agriculture Canada

Don Bertoia. "We went to visit each person who was concerned about the spraying — often in the evenings since many people weren't home during working hours. Sometimes we talked with them for one or two hours. Rob Ormrod was extremely helpful because he had seen firsthand what an established infestation can do to property values."

After much leg-work, permission to spray was granted by everyone but one citizen. And during the spray itself, the Kelowna office received only noise complaints about the helicopter. Adjustments to the turn-around areas solved that problem, and the spray was successfully completed.

"The key to that success," Don Bertoia says, "was the local contact. We knew a lot of people personally, and we met many on the street afterwards. That individual attention is an important role."

The Kelowna eradication staff. Photo by W. A. Cram

PUBLIC PARTICIPATION & THE GYPSY MOTH
Trial at Fort Langley

Lessons learned from the Kitsilano controversy were tested in 1983 and 1984. Augmented by the Canadian Forestry Service (CFS), and B.C. Forest Service (BCFS), and the B.C. Ministry of Agriculture (BCMA), the gypsy moth trapping and detection program was greatly expanded throughout the province. In 1982, male moths were captured in Fort Langley, but egg-mass searches failed to confirm any infestation. When moths were again trapped in 1983, a delineating survey, involving high-density trapping, indicated a possible epicentre of the infestation. Three egg-masses were discovered in November, and plans for a spring treatment program were initiated.

A letter from the Mayor of Fort Langley requesting municipal support for the proposed eradication program was sent in early January 1984. By February, information letters were distributed to affected residents in the area. Aware that the citizens had the right and power to decide what should be done about the gypsy moth, Vancouver Plant Health staff were careful to provide the residents with four control options, each to be discussed at the public meeting (*see* Appendix II). Each of the PPAC member agencies was represented at the meeting. Events included an overview of the gypsy moth problem, the film "The Gypsy Moth — A Dilemma," a lively and entertaining talk on the biology of the gypsy moth, and an outline of the implications of the pest to residents and industry.

Unfortunately, another local event in Fort Langley conflicted with the gypsy moth meeting and only six residents attended. However, the full agenda was present and the six citizens unanimously consented to the most comprehensive treatment option. If nothing else, it was an indication of the beginning of a successful public relations campaign.

A strong effort to advertise a second meeting via radio and newspapers attracted approximately 140 people in April, and they too agreed to the most comprehensive aerial and ground spray treatment option to ensure the success of the eradication program. No doubt, changes in the treatment substance of choice contributed to Agriculture Canada's public relations success. The biological insecticide, *Bacillus thuringiensis (B.t.)*, which was not a viable alternative in 1979, had replaced carbaryl and Dimilin. As indicated by the local response, a biological control agent was more readily accepted than a synthetic chemical one.

Still, Agriculture Canada was careful to respect citizen's rights. Prior to actual spraying, a door-to-door survey was conducted to get permission from the residents. As Henry S. Gerber, the Chairman of the Gypsy Moth Subcommittee wrote on April 24, 1984: "Full public co-operation is the name of the game now. Confrontation is a thing of the past!" Only one homeowner refused treatment.

Efforts were also made to announce the day and time of the spraying on radio broadcasts, but preliminary reports indicated that the advance notification was not adequate. The first of three ground spray applications of *B.t.* began in early May, and one aerial spray took place on May 24th. Trapping results the following autumn indicated complete success.

In 1984, trapping and detection surveys, confirmed another gypsy moth infestation on the Canadian Forces Base, Chilliwack, and led to a treatment program in the spring of 1985. In addition to Agriculture Canada's information and public relations, the Department of National Defence co-operated in such a complete manner — often taking over the public relations role — that the treatment was accomplished without incident. Three aerial applications of *B.t.* over approximately eight hectares took place that spring (Powell, 1985). But trapping results indicated that some larvae were missed or ineffectively covered by the spray applications. In 1986 and 1987, a combination of aerial and ground sprays successfully eradicated the gypsy moth from the Chilliwack area.

A major factor contributing to the successful treatments in Fort Langley and Chilliwack, notwithstanding the use of *B.t.* and a comprehensive public relations program, was the strengthened role of PPAC and the refinement of a strategic, interagency plan. Agreements between Agriculture Canada, CFS, BCFS, and BCMA ensured the sharing of resources such as manpower, funding, and expertise. All steps developed and implemented during these trial treatments helped smooth the way for future eradication programs in B.C. (*see* Appendix III).

But developments didn't stop there. One of the first tasks of a newly-appointed Agriculture Canada regional information officer in New Westminster was to develop a manual entitled, "Gypsy Moth Control Strategies: An Index to Public and Media Information Requirements." Detailed steps in planning and chairing public meetings were outlined, as well as a "Tips for Media" section. Also, a short cable television script featured Ralph Houghton, then regional director of the Food Production and Inspection Directorate and Gordon Powell, senior quarantine officer, discussing the problems associated with the gypsy moth from

a local perspective. The film "The Gypsy Moth — A Dilemma" was also included. Aired in Courtenay in 1985 after gypsy moths were discovered there, the program was simply one more step in providing information to the public so that eradication measures could be successfully implemented.

The best example of interagency planning and co-operation was the international information symposium on the gypsy moth held at the Robson Media Centre on November 5, 1985. Sponsored by the Plant Protection Advisory Council, and supported by various federal, provincial, municipal, and industry agencies, experts from Canada and the United States gathered to share their knowledge of the gypsy moth. Speakers discussed the history and spread of the gypsy moth and its devastation in the east, described detection strategies, and provided in-depth information on *B.t.* An update of the gypsy moth problem in British Columbia was followed by PPAC's strategic plan for the future.

Bob DeBoo, a manager with the B.C. Forest Service, developed a matrix for strategic planning to facilitate the functions and activities of several government agencies, on the assumption that roles and responsibilities would change. Three potential scenarios were identified: isolated gypsy moth occurrences, early establishment, and resident pest. Changing lead and support roles, and responsibilities of the various government agencies were carefully outlined for each scenario, and the plan became a national benchmark in inter-agency co-operation.

Since 1970, Agriculture Canada has conducted control programs in Ontario to eradicate incipient populations and to prevent further spread of the insect. Applications of carbaryl were used from 1970 to 1972. A sex pheromone was used in 1973, followed by two more years of carbaryl. In 1977 and 1978, Dimilin was applied, followed by carbaryl in 1980 and 1981. The biological insecticide, *B.t.*, was first used in 1982 in combination with carbaryl and Gypcheck®, a pathogenic virus (Jobin, 1985).

Ontario, Quebec, and the northeastern United States do not attempt to eradicate the gypsy moth as their populations are too large and widespread. But in British Columbia and the Pacific states, eradication was, and still is, the official policy. Therefore, in 1978, when gypsy moths were discovered in Kitsilano, Agriculture Canada officials had to choose a control substance which guaranteed eradication.

Recalling those hectic months, Dr. Bryan Frazer, an entomologist at the Agriculture Canada Vancouver Research Station said, "We knew from all past experience that *B.t.* was a kind of haphazard, useless material for eradication — you just couldn't count on it. Its efficacy was highly variable, so we just couldn't recommend it to the PQD staff."

Merriam Doucet and Greenpeace boldly announced to the public in 1978 that *B.t.* was a safe, biological control agent that should be used instead of Dimilin. But Agriculture Canada researchers had no scientific suport for that position. Indeed, at the 1985 symposium, Normand Dubois, of the U.S. Forest Service in Connecticut stated, "Because of formulation and application difficulties, results of operational use of *B.t.* in the 1960s and 1970s were often discouraging. With the discovery and commercialization of the more potent HD-1 strain, along with major improvements in formulation development, use of *B.t.* for gypsy moth suppression increased significantly in the 1980s."

"We had two or three choices," Dr. Frazer said. "One, Dimilin, an insect growth regulator, and carbaryl and orthene. These were registered to be applied from the ground and by air in uninhabited areas." Published reports on the efficiency of the various pesticides at the time showed Dimilin to be the safest, and research scientists recommended Dimilin to the PQD. Jim Nichols, Chief of the Division of Forest Pest Management in Pennsylvania stated at the 1985 symposium in Vancouver: "Dimilin is an excellent spray material for controlling gypsy moths. It is equal to or better than carbaryl and Dylox. Its safety record is second only to that of *B.t.*"

Unfortunately for the PQD officials, an initial 1978 EPA investigation of Dimilin found that, under certain conditions, it could be hazardous. About the same time that Agriculture Canada announced that Dimilin was their choice for a control substance, the EPA placed restrictions on its use over populated areas. Further investigation, however, revealed that the restrictions were unnecessary, but Agriculture Canada's credibility had already been weakened. The alternatives suggested by Greenpeace — *B.t.* and insecticidal soap were, at the time scientifically unreliable. Carbaryl, a proven substance, was recommended for use.

But improvements in the manufacture and formula of *B.t.* in the early 1980s had a dramatic impact upon later eradication plans for B.C. As Nichols (1985) stated, "Complaints, adverse letters, and telephone calls dropped off by at least 95 per cent, when *B.t.* came into use. Of course, we had to conduct a large-scale public relations program to inform the public on the nature of *B.t.*"

When Agriculture Canada began using *B.t.* in 1984, an information sheet was put into all of their public relations packages. As well, Agriculture Canada now tests each batch of *B.t.* for quality and health concerns prior to application. Every effort made to protect the public's health reinforces the government's expertise and credibility, and lessens the anxiety and public opposition to the proposed treatments.

MARK HARVEY
Canada's First Gypsy Moth Co-ordinator

Before Mark Harvey joined Agriculture Canada in November 1987, the task of developing and distributing gypsy moth public information materials and co-ordinating the treatment programs was part of regional biologist Sarah Sheffield's duties. But with three eradication programs planned for 1988, PPAC saw the need for a full-time co-ordinator. Mark Harvey's dedication to the job of handling both public relations and co-ordination of information flow for the Parksville, Colwood, and Kelowna programs was instrumental to the success of all three treatment efforts.

"I just took the devil's advocate position. I thought that if anything is going to go wrong, it will go wrong, and prepared for that.

"I tried to put myself in the position of the public first of all, and asked, 'Are we trying to hide anything?' Because I thought, if we were, we're sure to get caught.

"One of my first tasks was to dig into the literature on *B.t.* so there wouldn't be any surprises. And then I attended a B.C. Fruit Growers' Association meeting, set up a gypsy moth display, and approached the media with information about the gypsy moth, *B.t.*, and the proposed spraying program."

Mark Harvey, Canada's first gypsy moth co-ordinator.

Photo by S. Sheffield, Agriculture Canada

Even though the media had broadcast plans for the proposed spray, EarthCare visited Agriculture Canada's office regarding other matters. Don Bertoia then told them about the gypsy moth problem in Kelowna, and they returned later with their concerns.

"EarthCare had some *B.t.* reports that we weren't aware of," Harvey said. "They could have revealed that information at the public meeting and they could have challenged us, but they were very reasonable. They gave us the report that they were uncomfortable about."

Harvey then photocopied all the *B.t.* information and sent files to the Poison Control Centre, the Provincial Centre for Disease Control, the Provincial Health Unit in Kelowna, and the chief pathologist at the Kelowna General Hospital. As well, Harvey ensured that all medical practitioners in the three spray areas were informed of the plans through the B.C. Medical Association.

Medical practitioners were then aware of the program and were prepared to deal with any adverse effects their patients might have to the spray material. Harvey also informed the municipal councils, police, fire department, and other institutions that might be affected by the spray. Okanagan College, a bird sanctuary, and a water treatment plant located near the spray zone, were also informed. Homeowners within the spray zone were then sent an invitation to the February public meeting.

Dr. Innes, chief pathologist at the Kelowna Hospital, probably did more to reassure the citizens at the public meeting than any number of presentations by government experts.

"I didn't specifically ask him to attend the meeting," Mark Harvey said. "I was very careful to thank him for his professional help and made it clear that he would be welcome to attend the meeting if he wished to. I didn't want to give the appearance that we had wooed a medical specialist to become a spokesperson for the government."

Harvey also admits to some errors at the Kelowna public meeting. "We didn't make it clear enough in our presentations that there was a choice, and that's an important aspect of the program. Citizens must be given the option of refusing treatment, but the goal, of course, is unanimous consent."

Co-operation with interest groups, an open mind to dissenting views, and in-depth preparation led to the success of the treatment programs in Parksville, Colwood, and Kelowna.

As a testimony to Agriculture Canada's and PPAC's commitment to co-operative eradication programs, Merriam Doucet publically supported the eradication proposal during the Parksville public meeting.

Mark Harvey's co-ordinating role in battling gypsy moths in B.C. also created many additional benefits. An 18-minute video presentation on the "Gypsy Moth in British Columbia" was produced for internal circulation, and gypsy moth detection methods received more media attention. In January 1989, BCTV broadcast a report about the gypsy moth, focussing on people who had moved to B.C. from infested areas. As a result, Harvey received over 150 phone calls requesting inspection and, on the third inspection in February, egg masses were discovered on a ladder at a location in White Rock — a timely find!

Harvey approached local newspapers with informative articles about the gypsy moth, and many leads to possible finds surfaced. A trial co-operative venture between the provincial auto insurance agency and Agriculture Canada used licence transfer information to inform householders who had moved to B.C. from gypsy moth hotspots in eastern Canada and the U.S.

Harvey is convinced that more accurate detection and survey methods are one sure way to keep B.C. gypsy moth free. Nevertheless, in the event of another incipient infestation requiring treatment, steps for gaining public acceptance of the program are in place.

CONCLUSION

The intense public reaction to British Columbia's first gypsy moth eradication effort in 1979 was the catalyst for government agencies to revamp their attitudes toward urban pest management. Because of the major threat to B.C.'s forest-based economy should a gypsy moth infestation become established, a sense of urgency prevailed within government to gain public support for its eradication program. The response by government personnel was as dramatic and intense as the initial conflict, and the on-going process of refining public information and public participation procedures led to the success of each subsequent treatment program.

Greater co-operation and involvement of other agencies (CFS, BCFS, BCMAF, for example) has placed British Columbia in the forefront of pest management strategies in Canada. From their peripheral contribution in 1978, the Plant Protection Advisory Council has strengthened its position and role to encompass all aspects of strategic inter-agency planning and co-operation. Today, PPAC not only assesses actual or potential hazards to British Columbia agriculture and forestry from insects, plant diseases, weeds or other biotic agents — but also provides the broadest provincial forum for discussion of such hazards. As well, it advises and co-ordinates the actions of provincial, federal, and other agencies when new or recurring pests appear. Acting as a quality control watchdog, PPAC will notify the respective agency concerned when remedial actions taken are deemed inadequate or might result in unforeseen problems. Advising provincial and federal officials in the preparation of news releases, legislation or policies on pests in British Columbia — as well as establishing contingency procedures for new pests that may become established in the province — are also part of PPAC's mandate. Assessing biological or other control agents, reviewing the import and export of plant materials to ensure that only high quality pest-free stock is transported, and disseminating information and recommendations to member agencies or industries are all regular functions of PPAC.

Public Education

Since the Kitsilano infestation, several communities in British Columbia have been exposed to lengthy debates about the pest and how to deal with it. Public education is one of the best methods available to gain support for treatment measures. Materials such as pamphlets, articles, posters, videos, open house presentations, direct mailing, and regular contact between pest management officials and the public are sure ways to increase awareness of the problems associated with pests in the environment. As more people become aware of the gypsy moth threat, eradication programs should become easier to initiate. As Dr. Frazer said, "It takes a lot of energy to convince people that the potential threat of this pest is serious when they haven't seen it go on a rampage."

Alternative Insecticides

Much of British Columbia's success in eradicating pests with full public support can be attributed to the refinement of the alternative insecticide, *Bacillus thuringiensis, (B.t.).* The refinement and development of biological control substances is becoming a priority within agencies responsible for pest management, as public acceptance of any chemical in the environment will be increasingly difficult to attain.

Early Detection

Since the eastern provinces and the northeastern United States have resident populations of gypsy moth, continued introduction to British Columbia is inevitable. An integral part of gypsy moth control will be early detection and monitoring the province for signs of infestations. The expanded trapping and monitoring survey program, assisted by the various government agencies and supported by the Council of Forest Industries (COFI) and forest companies, deploys approximately 8,000 traps per year across the province.

Any expansion or refinement to the program will inevitably result in earlier detection of gypsy moths. Since B.C. has the highest rate of population increase in Canada, methods to selectively trap or monitor household movement of the moth into the province could help make the survey program more effective. Nevertheless, B.C. still has an excellent record of eradication.

Summary

The 10 years of experience gained in gypsy moth eradication measures from 1978 to 1988 has provided

Approximately 8,000 pheromone traps are placed throughout the province each year. Photo by S. Sheffield, Agriculture Canada

many valuable lessons to all those involved in the gypsy moth programs. The following steps are possible ways for government or industry agencies to achieve public support of broad-based, eradication measures in urban settings:

- ***Research.*** Be aware of all relevant research relating to substance options.
- ***Identify potential sources of conflict.*** Determine public opinion in any given area by listening, keeping a clipping file, and maintaining a communications line within and outside B.C. to know what others are doing or thinking; keep abreast of pesticide regulation and use, especially in urban areas.
- ***Plan thoroughly.*** Take the devil's advocate position and plan for all potential problems that could arise before, during, and after the public meeting and treatment program, and use a "decision-making profile" to determine the best option.
- ***Allocate personnel effectively.*** Hire communications specialists for communications duties and technicians for the treatment implementation.
- ***Keep no secrets.*** Approach the media and legitimate interest groups with information about the problem.
- ***Inform the public.*** Focus attention on potential risks and how the public will benefit from the program. Help the general public identify with the goals of the program.
- ***Present control options.*** Always give the public a choice. Don't make them feel as though they have no rights as citizens.
- ***Local expertise.*** Independent support by a local medical doctor or respected community leader has more influence than a panel of outside experts.
- ***Evaluate the campaign.*** Was is successful? Are there areas which need improvement? Revise techniques and/or information for the next program.
- ***Plan again.*** Develop the next program from accumulated experience and current information base.

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REFERENCES

British Columbia Ministry of Agriculture. 1978. ***Gypsy Moth Threatens British Columbia.*** BCMA Press Release.

British Columbia Plant Protection Advisory Council. 1988. ***Meeting Minutes, 1978–1988.***

Buffam, Paul E. 1985. ***The Gypsy Moth in Oregon, Washington and California.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

Cutlip, Scott, M. and Allen H. Center. 1971. ***Effective Public Relations.*** Prentice-Hall Inc., Englewood Cliffs.

Czerwinski, Christoph and Murray B. Isman. 1986. ***Urban Pest Management: Decision-making & Social Conflicts in the Control of Gypsy Moth in West Coast Cities.*** *In* Bulletin of the Entomological Society of America. 31 (1): 36-41.

DeBoo, R.F. 1985. ***Understanding the Gypsy Moth Threat in British Columbia: Developing a Strategic Plan.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

Dubois, Normand R. 1985. ***Field Use of Bacillus Thuringiensis to Control the Gypsy Moth.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

The EarthCarian. Number one, Volume one. Spring, 1988.

Edmunds, S.W. 1981. ***Environmental Policy: Bounded Rationality Applied to Unbounded Ecological Problems.*** *In* Environmental Policy Formation. Dean E. Mann (editor). D.D. Heath & Co., Toronto. pp. 191-201.

Ellis, Richard A. 1981. ***Project Outcomes Correlate with Public Participation Variable.*** Water Pollution Control Federation, 53(11): 1564-1567.

Farrow, M. 1978. ***Spray Feared Health Peril.*** Vancouver Express, 2:41:1.

Fournier, S. 1978. ***Moth Infestation Threatens Kitsilano.*** Vancouver Province. October 19, 1978, p. 4.

Frank, Richard A. *et al.* 1977. ***Public Participation in the Policy Formulation Process.*** Centre for Law and Social Policy.

Grady, Wayne. 1985. ***The Flight of the Gypsy Moth.*** Harrowsmith. No. 64, December, pp. 50-61.

Jobin, Luc. 1985. ***The Gypsy Moth (Lymantria Dispar (L.)) Situation, Experiences, and Control in Eastern Canada.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

Nichols, James O. 1985. ***Continental Perspectives: Pennsylvania and the Eastern United States.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

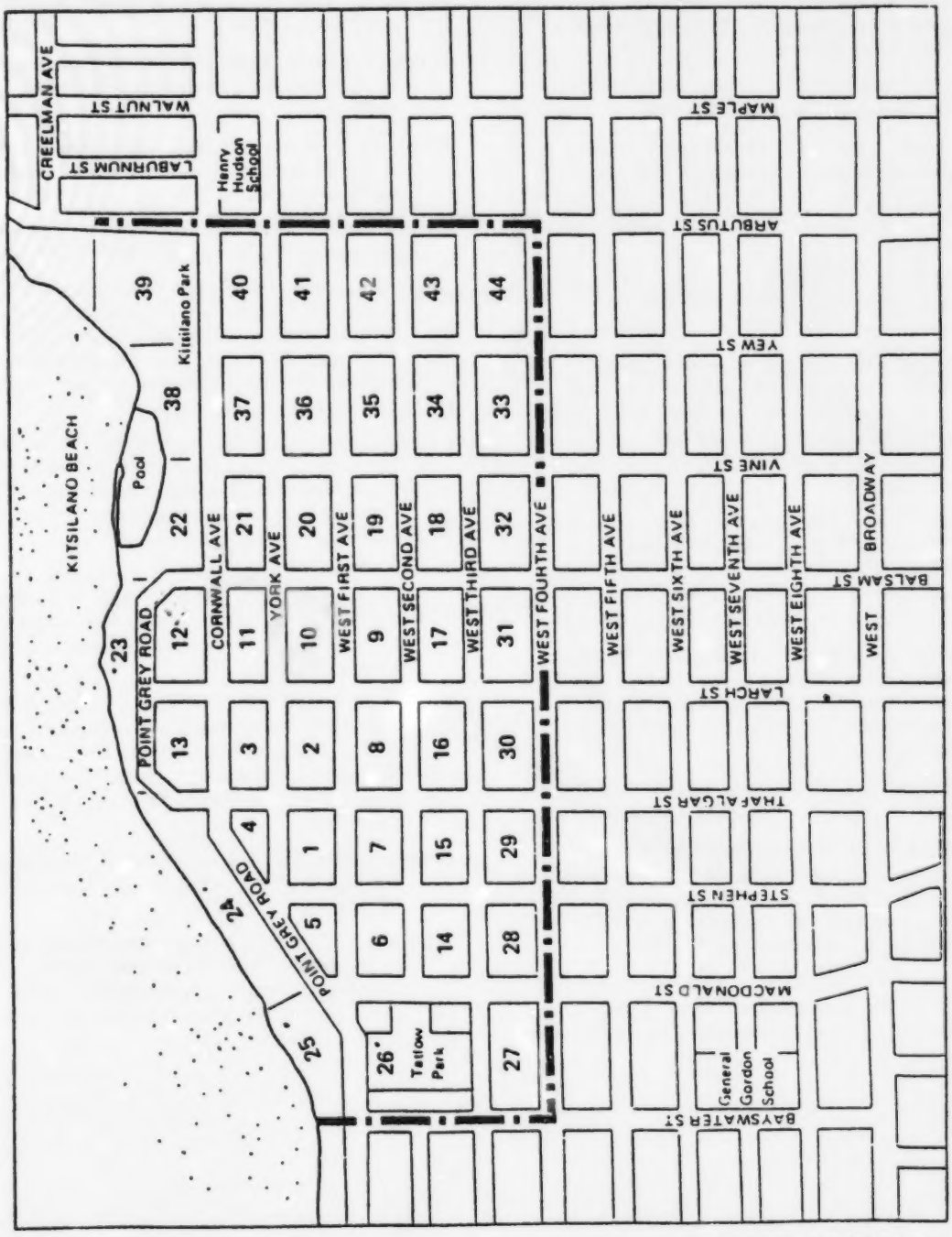
Powell, Gordon. 1985. ***The B.C. Situation: British Columbia Gypsy Moth Update.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

Puritch, G.S. and B.C. Brooks. 1981. ***Effects of Insecticidal Soap Used in the Gypsy Moth Control Program in Kitsilano on Insects and Vegetation.*** Canadian Forestry Service, Pacific Forest Research Centre. Victoria, B.C. BC-X-218.

Rossiter, Sean, 1979. ***What Really Happened When the Gypsy Moth Came to Kits.*** Vancouver Magazine, July, 1979.

Schmidt, A.C. 1985. ***The Gypsy Moth and Agriculture Canada: Past, Present and Future.*** *In* Understanding the Gypsy Moth Threat. B.C. Plant Protection Advisory Council Symposium, 1985. Vancouver, B.C.

APPENDIX I — *Kitsilano Infestation Area*



Source: Puritch and Brooks, 1981

APPENDIX II — *Fort Langley Control Options*

BASIC PROGRAM: LARVAL TRAPPING, LARVAL SEARCH, TRAPPING FOR MALE MOTHS, AND EGG MASS SEARCH.

OPTION 1: BASIC PROGRAM PLUS SPRAY OF R.R.R.O.W.

OPTION 2: ALL OF THE ABOVE PLUS GROUND SPRAY WHERE EGGS OR LARVAE ARE FOUND.

OPTION 3: ALL OF THE ABOVE PLUS A GENERAL SPRAY WITH A PEST CONTROL PRODUCT

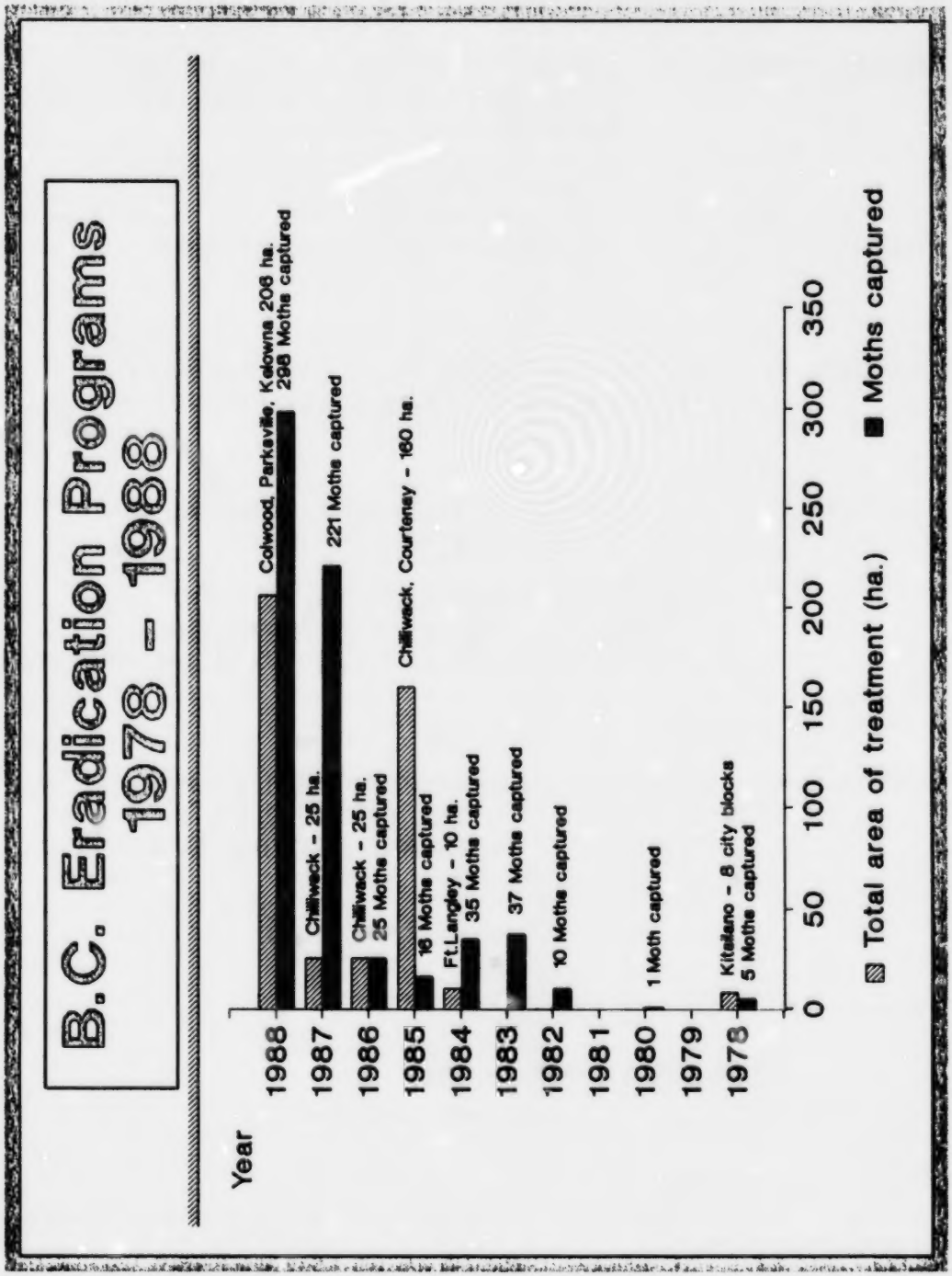
- WITH THE HOME OWNER'S CONSENT (APPROXIMATELEY 75 PROPERTIES) PENDING FEDERAL AND PROVINCIAL APPROVAL.

OPTION 4: ALL OF THE ABOVE PLUS AERIAL APPLICATION OF A PEST CONTROL PRODUCT (PENDING FEDERAL AND PROVINCIAL APPROVAL).

PROPOSED CONTROL PRODUCT:

BACILLUS THURINGIENSIS

APPENDIX III — *B.C. Eradication Programs 1978 - 1988*



APPENDIX IV — *Homeowner's Information Package*

Agriculture
Canada

Food Production and Inspection Branch
Direction générale, Production et inspection des aliments

Food Production and Inspection Branch
Agricultural Inspection Directorate
1921 Kent Road
Kelowna, B.C.
V1Y 7S6

Your file Votre référence

Our file Notre référence

Dear Resident:

In 1987, Agriculture Canada located an infestation of Gypsy Moth in your neighbourhood. As you are aware, there was a public information meeting held at Raymer Elementary School on February 18, 1988 to discuss the Gypsy Moth eradication program.

At that meeting it was explained that Gypsy Moth is a very distructive pest that would cause serious economic and environmental damage if it became established in B.C.

B.C. is now considered to be free of this insect, but a spot infestation has been detected in Kelowna. It is Agriculture Canada's responsibility to ensure that this population is eliminated before it has a chance to spread. We are therefore proposing an eradication program. It's success will be dependant upon the co-operation and support of residents and community groups in your area.

In order to eradicate this serious forest and garden pest, Agriculture Canada proposes to spray with Bacillus thuringiensis (B.t.) three times from late April to mid June by helicopter in the infested area. A ground spray of B.t. will be applied to a few properties only at the centre of the infestation during the same period. These actions will be followed by an intense adult male trapping program this summer to check the effectiveness of the control program.

Since your property falls within the proposed aerial spray zone, we ask your permission to apply the B.t. sprays to the trees and shrubs located on your property. The insecticide B.t. or Bacillus thuringiensis is not a chemical but a naturally occuring bacterium which has an extremely low toxicity (less toxic than table salt) to plants, domestic animals, fish and most insects but controls the Gypsy Moth and a few other moth larvae. You will be given advance notice of the sprays which will be carried out by a licensed pest control firm under the supervision of Agriculture Canada. All costs will be borne by the Federal Government.

.../2

Canada

We hope that you will support our efforts to eradicate this destructive pest. Would you please **COMPLETE THE ATTACHED CONSENT FORM, PLACE IT IN THE ENCLOSED ENVELOPE, and HANG IT ON YOUR FRONT DOOR** so it can be **PICKED UP TOMORROW.**

Should you not have the envelope out or fail to contact our office by March 31st, 1988, we will **ASSUME** that you have given your consent to the program. However, we would prefer to have your written consent. Should you have any questions, please contact us at 762-2458.

Yours truly,

C. Martin
Program Officer

CM/sk

CONSIDERATIONS FOR THE HOMEOWNER IN CONTROLLING GYPSY MOTH

In making your decision to participate in this collective effort to prevent establishment of Gypsy Moth in your community, some elaboration of the relative merits of ground spraying and helicopter spraying will be useful. Some of the inconveniences of each method should also be recognized and we hope, tolerated, to achieve optimum chance of success with this eradication program.

Gypsy Moth egg masses may hatch any time between late April and June. The Gypsy Moth is most susceptible to control measures during the early stages of larval (caterpillar) development (the first 2-3 weeks of the larval stage). If chemical insecticides with reasonable persistance were used, it is possible that a single application by ground equipment or helicopter would be effective.

However, Agriculture Canada has chosen B.t. for these reasons:

-B.t. is a naturally occuring element in the environment;

-It's effects are specific to a few insects and it does not harm bees;

-It has no observed effects on humans and animals

-It is more acceptable to homeowners and community groups than other types of control agents.

The biggest disadvantage is that it deteriorates quickly after application and, therefore, several sprays are required.

APPLICATION METHODS

B.t. can be applied as ground sprays or aerial (helicopter) sprays. Both methods are useful in Gypsy Moth control, but there are important advantages and disadvantages to consider in selecting either one.

GROUND APPLICATION

This method, with some exceptions, probably provides the best coverage. The spray is only applied to the foliage of trees and shrubs. Another advantage is that items that don't need spraying, such as lawns, buildings, and outdoor furniture, can be avoided. However, it has several disadvantages:

-Spray crews must drag hose lines into yards and gardens (carefully, of course);

-Application is slow and tedious with sprayers operating all day for several days per application;

-Spraying is often an attractive nuisance to children and pets

-Ground spraying is several times more costly per unit area than aerial spraying. Cost considerations are as critical for government activities as for any commercial enterprise.

HELICOPTER APPLICATION

Helicopter application provides good coverage, and has several advantages over ground spray.

-Application is very quick. Spraying of the proposed aerial treatment area in Kelowna would be completed in less than an hour.

-Aerial sprays are applied at daybreak. At this early hour, when most residents are inside, exposure to the spray and interference with normal activities are kept to a minimum. Some inconvenience, because of the noise is unavoidable, but as explained above, it will be short.

-Aerial spray provides good coverage of the upper portions of trees. This is important, because young Gypsy Moth caterpillars have a preference for the new foliage which develops at the outer and upper portions of plants. Some spotting of vehicles, buildings, and other outdoor items is unavoidable, but the deposit can easily be washed off with water. All residents within the spray area would be advised of spray dates well in advance, and can cover items or move them indoors before the sprays if they wish.

-Because aerial spraying is so much quicker and cheaper than ground sprays, we can cover a much larger area by air than by ground. This gives us a much better chance of eradicating any Gypsy Moth

caterpillars that have spread out of the initial infestation sites (young Gypsy Moth caterpillars can be blown more than a mile from their hatching site). Experience has shown that unless a sufficient area is treated, chances of eliminating Gypsy Moth are poor.

All things considered, we believe that the proposed Gypsy Moth Eradication Program, combining B.t. helicopter sprays over the infested area with limited B.t. ground sprays in the heavily infested core area, offers the best chance of eliminating this pest from the Kelowna community and at the same time protecting the health and safety of its citizens.